



Rec'd PCT/PTO 16 AUG 2002

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SEQUENCE LISTING

<110> Chiron SpA
GRANDI Guido
RAPPUOLI Rino
GIULIANI Marzia Monica
PIZZA Mariagrazia

<120> ENHANCEMENT OF BACTERICIDAL ACTIVITY OF NEISSERIA ANTIGENS
WITH OLIGONUCLEOTIDES CONTAINING CG MOTIFS

<130> P023888WO

<140> PCT/IB00/00176

<141> 2000-02-09

<150> US-60/121,792

<151> 1999-02-26

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gaccggccgg tcggcatccc cgaccccgcc ggaacgacgg tcggcgggcg cggggccgtc 180
tataccgttg taccgcacct gtccctgccc cactgggcgg cgaggattt cgccaaaagc 240
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Asp Thr Ser Val Ile Asn Gly Pro Asp Arg Pro Val Gly Ile Pro Asp

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Asp	Gly	Lys	Ala	Pro	Ile	Leu	Gly	Tyr	Ala	Glu	Asp	Pro	Val	Glu	Leu
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Lys	Tyr	Ile	Arg	Ile	Gly	Tyr	Ala	Asp	Lys	Asn	Glu	His	Pro	Tyr	Val
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Ser	Ile	Gly	Arg	Tyr	Met	Ala	Asp	Lys	Gly	Tyr	Leu	Lys	Leu	Gly	Gln
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Val Gly Asp Thr Tyr Asn Asp Thr His Gly Ser Ala Ile Ile Lys Ser					
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Leu Tyr Ala Thr Gly Phe Phe Asp Asp Val Arg Val Glu Thr Ala Asp					
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Gly Gln Leu Leu Leu Thr Val Ile Glu Arg Pro Thr Ile Gly Ser Leu					
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Asn Ile Thr Gly Ala Lys Met Leu Gln Asn Asp Ala Ile Lys Lys Asn					
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Arg Val Asp Ile Asp Ile Thr Ile Asp Glu Gly Lys Ser Ala Lys Ile 165 170 175		
Thr Asp Ile Glu Phe Glu Gly Asn Gln Val Tyr Ser Asp Arg Lys Leu 180 185 190		
Met Arg Gln Met Ser Leu Thr Glu Gly Gly Ile Trp Thr Trp Leu Thr 195 200 205		
Arg Ser Asn Gln Phe Asn Glu Gln Lys Phe Ala Gln Asp Met Glu Lys 210 215 220		
Val Thr Asp Phe Tyr Gln Asn Asn Gly Tyr Phe Asp Phe Arg Ile Leu 225 230 235 240		
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Phe Val Leu His Ile Glu Pro Gly Arg Lys Ile Tyr Val Asn Glu Ile 340 345 350		
His Ile Thr Gly Asn Asn Lys Thr Arg Asp Glu Val Val Arg Arg Glu 355 360 365		
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 Lys Thr Tyr Asp Asp Asn Ser Ser Ser Ala Thr Gly Gly Arg Val Gln
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 740 745 750
 Leu Arg Tyr Ser Ala Gly Gly Ala Val Thr Trp Leu Ser Pro Leu Gly
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 Val Gly Asp Thr Tyr Asn Asp Thr His Gly Ser Ala Ile Ile Lys Ser
 50 55 60
 Leu Tyr Ala Thr Gly Phe Phe Asp Asp Val Arg Val Glu Thr Ala Asp
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 Gly Gln Leu Leu Leu Thr Val Ile Glu Arg Pro Thr Ile Gly Ser Leu
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 Asn Ile Thr Gly Ala Lys Met Leu Gln Asn Asp Ala Ile Lys Lys Asn
 100 105 110
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 Lys Leu Asn Ile Gln Ile Thr Pro Lys Val Thr Lys Leu Ala Arg Asn
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 Arg Val Asp Ile Asp Ile Thr Ile Asp Glu Gly Lys Ser Ala Lys Ile

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Asp	Thr	Asp	Ile	Gln	Thr	Asn	Glu	Asp	Lys	Thr	Arg	Gln	Thr	Ile	Lys				
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Glu	Gly	Asp	Thr	Asn	Glu	Val	Pro	Lys	Ala	Glu	Leu	Glu	Lys	Leu	Leu				
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Thr	Met	Lys	Pro	Gly	Lys	Trp	Tyr	Glu	Arg	Gln	Gln	Met	Thr	Ala	Val				
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Phe	Val	Leu	His	Ile	Glu	Pro	Gly	Arg	Lys	Ile	Tyr	Val	Asn	Glu	Ile				
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His	Ile	Thr	Gly	Asn	Asn	Lys	Thr	Arg	Asp	Glu	Val	Val	Arg	Arg	Glu				
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Ser	Lys	Glu	Arg	Val	Glu	Leu	Leu	Gly	Tyr	Phe	Asp	Asn	Val	Gln	Phe				
385					390					395					400				
Asp	Ala	Val	Pro	Leu	Ala	Gly	Thr	Pro	Asp	Lys	Val	Asp	Leu	Asn	Met				
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Ser	Leu	Thr	Glu	Arg	Ser	Thr	Gly	Ser	Leu	Asp	Leu	Ser	Ala	Gly	Trp				
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Val	Gln	Asp	Thr	Gly	Leu	Val	Met	Ser	Ala	Gly	Val	Ser	Gln	Asp	Asn				
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Arg Lys Ala Ser Thr Ser Val Lys Gln Tyr Lys Thr Thr Thr Ala Gly		
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Gly Gly Val Arg Met Gly Ile Pro Val Thr Glu Tyr Asp Arg Val Asn		
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Phe Gly Leu Ala Ala Glu His Leu Thr Val Asn Thr Tyr Asn Lys Ala		
	530 535	540
Pro Lys Arg Tyr Ala Asp Phe Ile Arg Lys Tyr Gly Lys Thr Asp Gly		
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Ala Asp Gly Ser Phe Lys Gly Leu Leu Tyr Lys Gly Thr Val Gly Trp		
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Gly Arg Asn Lys Thr Asp Ser Ala Ser Trp Pro Thr Arg Gly Tyr Leu		
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Thr Gly Val Asn Ala Glu Ile Ala Leu Pro Gly Ser Lys Leu Gln Tyr		
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Tyr Ser Ala Thr His Asn Gln Thr Trp Phe Phe Pro Leu Ser Lys Thr		
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Phe Thr Leu Met Leu Gly Gly Glu Val Gly Ile Ala Gly Gly Tyr Gly		
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Arg Thr Lys Glu Ile Pro Phe Phe Glu Asn Phe Tyr Gly Gly Gly Leu		
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Asp Glu Tyr Gly Glu Lys Ile Ser Tyr Gly Gly Asn Lys Lys Ala Asn		
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Thr Val Arg Leu Ser Leu Phe Ala Asp Ala Gly Ser Val Trp Asp Gly		
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Glu Asn Ala His Lys Ser Thr Phe Thr Asn Glu Leu Arg Tyr Ser Ala		

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Tyr Ala Tyr Pro Leu Lys Lys Lys Pro Glu Asp Glu Ile Gln Arg Phe					
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Gln Phe Gln Leu Gly Thr Thr Phe					
	785		790		
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Met Lys Leu Lys Gln Ile Ala Ser Ala Leu Met Val Leu Gly Ile Ser					
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Pro Leu Ala Leu Ala Asp Phe Thr Ile Gln Asp Ile Arg Val Glu Gly					
	20		25		30
Leu Gln Arg Thr Glu Pro Ser Thr Val Phe Asn Tyr Leu Pro Val Lys					
	35		40		45
Val Gly Asp Thr Tyr Asn Asp Thr His Gly Ser Ala Ile Ile Lys Ser					
	50		55		60
Leu Tyr Ala Thr Gly Phe Phe Asp Asp Val Arg Val Glu Thr Ala Asp					
	65		70		75
Gly Gln Leu Leu Leu Thr Val Ile Glu Arg Pro Thr Ile Gly Ser Leu					
	85		90		95
Asn Ile Thr Gly Ala Lys Met Leu Gln Asn Asp Ala Ile Lys Lys Asn					
	100		105		110
Leu Glu Ser Phe Gly Leu Ala Gln Ser Gln Tyr Phe Asn Gln Ala Thr					
	115		120		125
Leu Asn Gln Ala Val Ala Gly Leu Lys Glu Glu Tyr Leu Gly Arg Gly					
	130		135		140
Lys Leu Asn Ile Gln Ile Thr Pro Lys Val Thr Lys Leu Ala Arg Asn					
	145		150		155
Arg Val Asp Ile Asp Ile Thr Ile Asp Glu Gly Lys Ser Ala Lys Ile					
	165		170		175
Thr Asp Ile Glu Phe Glu Gly Asn Gln Val Tyr Ser Asp Arg Lys Leu					
	180		185		190
Met Arg Gln Met Ser Leu Thr Glu Gly Gly Ile Trp Thr Trp Leu Thr					

195					200					205					
Arg	Ser	Asn	Gln	Phe	Asn	Glu	Gln	Lys	Phe	Ala	Gln	Asp	Met	Glu	Lys
	210					215					220				
Val	Thr	Asp	Phe	Tyr	Gln	Asn	Asn	Gly	Tyr	Phe	Asp	Phe	Arg	Ile	Leu
	225					230					235				240
Asp	Thr	Asp	Ile	Gln	Thr	Asn	Glu	Asp	Lys	Thr	Lys	Gln	Thr	Ile	Lys
				245					250					255	
Ile	Thr	Val	His	Glu	Gly	Gly	Arg	Phe	Arg	Trp	Gly	Lys	Val	Ser	Ile
			260					265					270		
Glu	Gly	Asp	Thr	Asn	Glu	Val	Pro	Lys	Ala	Glu	Leu	Glu	Lys	Leu	Leu
		275					280					285			
Thr	Met	Lys	Pro	Gly	Lys	Trp	Tyr	Glu	Arg	Gln	Gln	Met	Thr	Ala	Val
	290					295					300				
Leu	Gly	Glu	Ile	Gln	Asn	Arg	Met	Gly	Ser	Ala	Gly	Tyr	Ala	Tyr	Ser
	305					310					315				320
Glu	Ile	Ser	Val	Gln	Pro	Leu	Pro	Asn	Ala	Glu	Thr	Lys	Thr	Val	Asp
				325					330					335	
Phe	Val	Leu	His	Ile	Glu	Pro	Gly	Arg	Lys	Ile	Tyr	Val	Asn	Glu	Ile
			340					345					350		
His	Ile	Thr	Gly	Asn	Asn	Lys	Thr	Arg	Asp	Glu	Val	Val	Arg	Arg	Glu
		355					360					365			
Leu	Arg	Gln	Met	Glu	Ser	Ala	Pro	Tyr	Asp	Thr	Ser	Lys	Leu	Gln	Arg
	370					375					380				
Ser	Lys	Glu	Arg	Val	Glu	Leu	Leu	Gly	Tyr	Phe	Asp	Asn	Val	Gln	Phe
	385					390					395				400
Asp	Ala	Val	Pro	Leu	Ala	Gly	Thr	Pro	Asp	Lys	Val	Asp	Leu	Asn	Met
				405					410					415	
Ser	Leu	Thr	Glu	Arg	Ser	Thr	Gly	Ser	Leu	Asp	Leu	Ser	Ala	Gly	Trp
			420					425					430		
Val	Gln	Asp	Thr	Gly	Leu	Val	Met	Ser	Ala	Gly	Val	Ser	Gln	Asp	Asn
		435					440					445			
Leu	Phe	Gly	Thr	Gly	Lys	Ser	Ala	Ala	Leu	Arg	Ala	Ser	Arg	Ser	Lys
	450					455					460				
Thr	Thr	Leu	Asn	Gly	Ser	Leu	Ser	Phe	Thr	Asp	Pro	Tyr	Phe	Thr	Ala
	465					470					475				480
Asp	Gly	Val	Ser	Leu	Gly	Tyr	Asp	Val	Tyr	Gly	Lys	Ala	Phe	Asp	Pro

485										490					495				
Arg	Lys	Ala	Ser	Thr	Ser	Ile	Lys	Gln	Tyr	Lys	Thr	Thr	Thr	Ala	Gly				
			500					505						510					
Ala	Gly	Ile	Arg	Met	Ser	Val	Pro	Val	Thr	Glu	Tyr	Asp	Arg	Val	Asn				
		515					520					525							
Phe	Gly	Leu	Val	Ala	Glu	His	Leu	Thr	Val	Asn	Thr	Tyr	Asn	Lys	Ala				
		530				535					540								
Pro	Lys	His	Tyr	Ala	Asp	Phe	Ile	Lys	Lys	Tyr	Gly	Lys	Thr	Asp	Gly				
545					550					555					560				
Thr	Asp	Gly	Ser	Phe	Lys	Gly	Trp	Leu	Tyr	Lys	Gly	Thr	Val	Gly	Trp				
				565					570					575					
Gly	Arg	Asn	Lys	Thr	Asp	Ser	Ala	Leu	Trp	Pro	Thr	Arg	Gly	Tyr	Leu				
			580					585					590						
Thr	Gly	Val	Asn	Ala	Glu	Ile	Ala	Leu	Pro	Gly	Ser	Lys	Leu	Gln	Tyr				
		595					600					605							
Tyr	Ser	Ala	Thr	His	Asn	Gln	Thr	Trp	Phe	Phe	Pro	Leu	Ser	Lys	Thr				
		610				615					620								
Phe	Thr	Leu	Met	Leu	Gly	Gly	Glu	Val	Gly	Ile	Ala	Gly	Gly	Tyr	Gly				
625					630					635					640				
Arg	Thr	Lys	Glu	Ile	Pro	Phe	Phe	Glu	Asn	Phe	Tyr	Gly	Gly	Gly	Leu				
				645					650					655					
Gly	Ser	Val	Arg	Gly	Tyr	Glu	Ser	Gly	Thr	Leu	Gly	Pro	Lys	Val	Tyr				
			660					665					670						
Asp	Glu	Tyr	Gly	Glu	Lys	Ile	Ser	Tyr	Gly	Gly	Asn	Lys	Lys	Ala	Asn				
		675					680				685								
Val	Ser	Ala	Glu	Leu	Leu	Phe	Pro	Met	Pro	Gly	Ala	Lys	Asp	Ala	Arg				
		690				695					700								
Thr	Val	Arg	Leu	Ser	Leu	Phe	Ala	Asp	Ala	Gly	Ser	Val	Trp	Asp	Gly				
705					710					715					720				
Lys	Thr	Tyr	Asp	Asp	Asn	Ser	Ser	Ser	Ala	Thr	Gly	Gly	Arg	Val	Gln				
				725					730					735					
Asn	Ile	Tyr	Gly	Ala	Gly	Asn	Thr	His	Lys	Ser	Thr	Phe	Thr	Asn	Glu				
			740					745					750						
Leu	Arg	Tyr	Ser	Ala	Gly	Gly	Ala	Val	Thr	Trp	Leu	Ser	Pro	Leu	Gly				
		755					760					765							
Pro	Met	Lys	Phe	Ser	Tyr	Ala	Tyr	Pro	Leu	Lys	Lys	Lys	Pro	Glu	Asp				

770						775						780
Glu	Ile	Gln	Arg	Phe	Gln	Phe	Gln	Leu	Gly	Thr	Thr	Phe
785					790					795		